# JOURNAL OF THEORETICAL BIOLOGY U. OF ILL.

QH 301 J75

U. of ILL. LIBRARY

MAY 29 1967

CHICAGO CIRCLE

C! : of Editor: J. F. DANIELLI

## Editorial Board:

E. A. BARNARD

M. CALVIN

B. G. CRAGG

H. EYRING

D. A. GLASER

D. MAZIA

A. ROBERTSON

C. H. WADDINGTON

L. WOLPERT

M. YČAS

J. Z. Young

**VOLUME 13** 

December 1966



ACADEMIC PRESS
London and New York

Copyright © 1966, by Academic Press Inc. (London) Ltd.

### ALL RIGHTS RESERVED

No part of this volume may be reproduced in any form, by photostat, microfilm, or any other means, without written permission from the publishers.

# Contents of Volume 13

# December 1966

Fraser, A., Burnell, D. and Miller, D., Simulation of Genetic Systems. X. Inversion Polymorphism	1
Levey, H. C. and Perret, C. J., A Note on the Theory of Uncatalysed Linear Expanding Systems	15
VAIDHYANATHAN, V. S., Theory of Mechano-electric Membrane Transducers	18
VAIDHYANATHAN, V. S. and PHILLIPS, H. M., Mobile Ion Interactions in the Membrane Phase	32
GÜNTHER, B. and DE LA BARRA, B. L., A Unified Theory of Biological Similarities	48
Morowitz, H. J., Physical Background of Cycles in Biological Systems	60
Essig, A., Isotope Interaction and "Abnormal" Flux Ratios—A Frictional Model	63
Essig, A., Kedem, O. and Hill, T. L., Net Flow and Tracer Flow in Lattice and Carrier Models.	72
Darvey, I. C., Prokhovnik, S. J. and Williams, J. F., The Determination of the Number of Intermediates in Enzyme Catalysed Reactions	90
Soloway, A. H., Aromatic Hydroxylation—a New Biosynthetic Mechanism	100
ZIMMERMAN, J. M. and SIMHA, R., The Kinetics of Cooperative Unwinding and Template Replication of Biological Macromolecules	106
PIELOU, E. C., The Measurement of Diversity in Different Types of Biological Collections	131
KIMIZUKA, H., Ion Current and Potential across Membranes	145
RALPH, R. K. and BAGULEY, B. C., Regulation of Protein Biosynthesis	164

WEVER, R., The Duration of Re-entrainment of Circadian Rhythms after Phase Shifts of the Zeitgeber	187
TAKAHASHI, M., Theoretical Basis for Cell Cycle Analysis. I. Labelled Mitosis Wave Method	202
THIEMER, E. KRÜGER, Formal Theory of Drug Dosage Regimens. I. SAMIS, H. V., Jr., A Concept of Biological Aging: The Role of Compensatory Processes	212
TALLIS, G. M. and LEYTON, M., A Stochastic Approach to the Study of Parasite Populations	251
SMITH, M. H., The Amino Acid Composition of Proteins	261
BOYD, W. J. R., Problems in the Interpretation of the Inheritance of Leaf Rust Resistance in the Common Wheat	283
DEERING, R. A., KRAUS, A. A., Jr., GRAY, D. M. and KILKSON, R., Some Theoretical Considerations of Polarized Light Effects on Unoriented Biological Systems	295
ACLAND, J. D., Active Transfer and the Curie Principle	318
CAMPOS ROSADO, J. M. and ROBERTSON, A., The Genetic Control of Sex Ratio	324
SUGITA, M., Functional Analysis of Chemical Systems in vivo using a Logical Circuit Equivalent. IV. Simulation of Cellular Control Systems using a Hybrid Computing System	330
KILKSON, R., The Structure and Evolution of Chromosomes	357
STANLEY, J., A Mathematical Theory of the Growth of Populations of the Flour Beetle <i>Tribolium confusum</i> , Duval. IX. The Persistence of Tunnels in the Flour Mass	379
GREEN, W. A., Aspects of Some Co-factor Requirements in Tumour Metabolism	412
LETTER TO THE EDITOR— SOLOWAY, A. H., Squalene to Lanosterol—a Possible Biosynthetic Pathway	429
Announcement	(L)